

# **Geospatially Enabling Battle Command: the Common Ground JCTD**

**Presentation to  
EUCOM/AFRICOM S&T CONFERENCE**

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**Steven A. Grant, Ph.D.  
International Research Office  
US Army Engineer Research and Development Center  
London, United Kingdom**



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# Background and Objective

- The Common Ground Program began in FY09 with both Joint Concept Technical Demonstration and Coalition Warfare Program funding.
- JFCOM is the Operation Manager lead.
- The NATO Consultation, Command and Control Agency (NC3A) [The Hague, Netherlands] is the deputy OM, TM, and XM.
- Given Common Ground's partnership with performers in EUCOM's AOR, ERDC, as the Technical Manager, believed that it is appropriate to offer to brief at this and subsequent conferences.



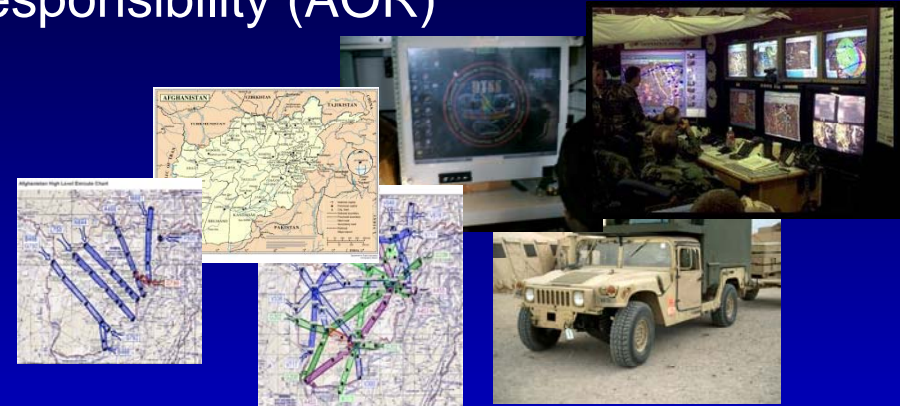
# Outline

- Problem statement
- Operational objectives
- Enabling conditions
- Partners
- Current efforts in this AOR



# Problem statement

- With increasing frequency, US, NATO, and Coalition nations are becoming global defense partners executing combined operations beyond the traditional North Atlantic and EUCOM Areas of Responsibility (AOR)
  - Afghanistan (ISAF)
  - Iraq (OIF)
  - Balkans (Kosovo and Bosnia)
  - Darfur
  - Mediterranean (Active Endeavor)
  - Horn of Africa
- These operations frequently result in ad-hoc, disjointed, and non-interoperable command and control (C2), simulation, and Geospatial Information Systems (GIS), yielding suboptimal effectiveness.



# Three developments may enable solutions to these problems

- The maturation of analytic and network-enabling technology from Army investments,
- The broadening use of relevant commercial technologies, and
- The increasing acceptance of DoD, international, and open standards.



# Army Investments

- Battle Management Language (BML) and Geospatially enabled BML (geoBML)
- Engineered Knowledge
- Tactical Spatial Objects (TSO)



# Battle Management Language

- The unambiguous language used to command and control forces and equipment conducting military operations and to provide for situational awareness and a shared, common operational picture.





# geoBML

- GeoBML extends BML into the geospatial domain to fulfill the need of moving from raw terrain data to information through recognition of potentially useful data products. The GeoBML concept was formulated as a means of harnessing the analytical power of Geographic Information Systems (GIS) and presenting this information to the Warfighter in terms that he can more easily apply to the battle-command process.



# Tactical Spatial Objects

- Analytical geospatial objects extracted from terrain-feature data described in tactical terms of military aspects of terrain that directly supports the planning and execution of tactical military operations. TSOs are meant to be linked to military operational tasks taking into account the effects of terrain and weather thus turning raw data into knowledge about the battlefield. They are defined by subject matter experts (SMEs) in the operational domain and are grounded in military doctrine.



# Engineered Knowledge

- Engineered Knowledge is the representation and organization of knowledge supporting Command and Control. The fundamental data and information that is used in Engineered Knowledge is readily available in manuals, doctrinal texts, training material and a multitude of other sources. Engineered Knowledge systems are developed to organize, integrate, and automate this information in a readily usable fashion for Decision Support.



# Commercial developments

The adoption of ESRI GIS technology as an Enterprise License Agreement (ELA) capability for both the U.S., under Commercial Joint Mapping Tool Kit (CJMTK), and NATO under its Core Geographic Services (NCGS) represents a common framework to create a Coalition-wide Geospatial Service Oriented Architecture (GSOA).



# Standards

- JC3IEDM: Joint Command, Control and Consultation Information Exchange Data Model (Multilateral Interoperability Programme)
- CJMTK: Commercial Joint Mapping Toolkit (NGA)
- NCGS: NATO Core Geographic Services (NC3A)

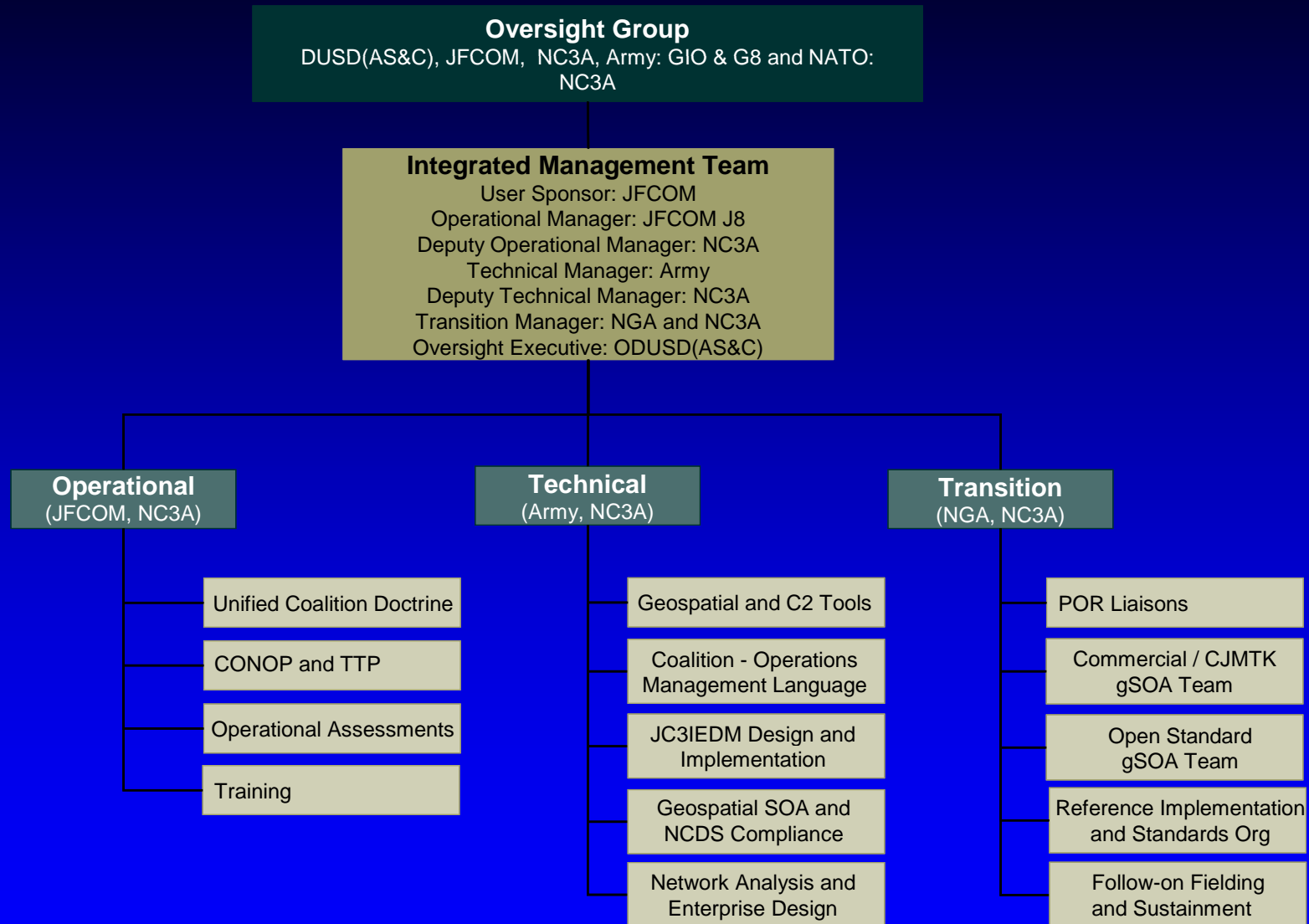


# Objectives

1. Provide a common, shared, operational capability that creates actionable geospatial information and GEOINT, integrated within Battle Command (C4I) processes in support of ground combat operations
  - *Common Geospatial Tools across all domains (Provisioned: CJMTK ELA)*
2. Implement that operational capability in a manner that is easily understood and used by geospatial, C2, and intelligence operators
  - *US and NATO doctrinally founded TTPs and common information content*
  - *Cross domain effort ....Geospatial and Battle Command*
3. Provide the capability to Service, Joint and NATO forces in a framework optimizing adoption, accessibility, and interoperability.
  - *Architectural approach based upon standards (e.g., JC3IEDM and C2Core)*
4. Provide these services in a cost-efficient and sustainable manner.
  - *Enterprise License Agreement .... License and Maintenance*
  - *Open, internationally accepted standards*



# Partners and Roles



# Functionality requirements

- Joint:
  - JFCOM (J8) Determining COCOM JC2 Requirements
- Army:
  - Future Combat System Operational Requirements;
  - Distributed Common Ground System-Army (DCGS-A)
- NGA:
  - Commercial Joint Mapping Toolkit (CJMTK) Requirements
- NATO:
  - NATO Core Geographic Services Requirements





# Concept of Operations

- Multi-national ground force, to include at least one US Brigade, under NATO control and two National forces supported by their individual C4I and geospatial systems.
- All C2 systems will have C4I-geospatial decision tools and analytic software services to support plan development, 2) the architectural components, a geo-extended JC3IEDM and OML that allows discovery of mission and task relevant C2 and actionable geospatial information products.
- Plans developed using geospatial information will be sent via the JC3IEDM to the simulation systems supporting the US and Nations.



# Common Ground Architectural Foundation

- Based upon military, international, and COTS standards
  - US Army Data Model – Geospatial (ADM-(G))
  - NGA's NSG Feature Data Dictionary (NFDD)
  - Open Geospatial Consortium (e.g. GML, WFS, WMS)
  - ESRI geo-database
  - 
  - Joint C3 Information Exchange Data Model (JC3IEDM) / STANAG 5525
  - UCORE and C2CORE data information exchange standards (US)
  - US JC3IEDM C2 Interoperability Group / Software Developers Kit (US)
  - 
  - Network Centric Enterprise Services (Joint-Service) and DoD 8320.2
  - NATO Network Enterprise Capability (NNEC)
  - Army Enterprise Service Oriented Architecture Foundation (SOAF-A)
  -
- Geospatial SOA components for C4I
  - Common, shared Enterprise geospatial capabilities
  - US: NGA's Commercial Joint Mapping Toolkit (CJMTK)
  - NATO: Core Geographic Services (CGS)



# Transition schedule consists of three spirals

- 2QFY10, 2QFY11, and 4QFY11
- Four categories of deliverables
  - Geo-analytic tools supporting C4ISR processes,
  - Architectural components associated with the C-OML, BML, geoBML and JC3IEDM extensions,  
JFCCOM J8:
  - An integrated GSOA framework consistent with Network Centric Data Strategies, Network Centric Enterprise Services, and NATO Network Enabled Capability, and
  - Release of documentation to standards organizations (e.g., Multilateral Interoperability Programme and Open Geospatial Consortium)



# Current issues in this AOR

- Agreements to permit collaboration
  - NC3A and its precursor organizations have been in existence for 50 years, yet the first MOA between the Army (SMDC) and NC3A was signed two weeks ago.
  - Fortunately, Common Ground technologies may be covered under a renegotiated geospatial MOU between DOD and NATO, which will be renegotiated shortly to allow for the exchange of geospatial technologies in NATO mission areas.
- Effort to make NATO generally aware of the potential value added by the Common Ground program as a means to speed and broaden the adoption of these technologies.
- Collaborate with (or initiate) appropriate NATO Research and Technical Organization working groups to facilitate technology transfer.
  - In particular, the Common Ground team is working closely with the NATO RTA Modeling and Simulation Group 048, entitled “Coalition Battle Management Language”



# Conclusion

C2 and Geospatial Interoperability with coalition partners has been a longstanding problem. It is hoped that recent technological and commercial developments, coupled with coalition-based management for the life of the project could yield a rapid and durable way forward to resolving these issues.

